BRIAN PRECHTEL (K9067-1)

Fresh-cut apple slices like this one quickly turn brown and mushy when exposed to air. ARS chemist Dominic Wong was part of a team that discovered that certain calcium salts protect apple slices from changes in color, taste, or texture.

Fresh-Cut Apples

A New Convenience Food

Fresh-cut apple slices should be available soon to consumers nationwide, thanks to a cooperative research and development agreement between ARS and Mantrose-Haeuser Co., Inc., of Attleboro, Massachusetts.

The refrigerated, packaged slices last 2 to 3 weeks without browning or losing crispness. Schoolchildren and some consumers are already enjoying the new apple treat, which should be available nationwide within a few months.

"We've been working on methods to preserve fresh-cut fruit since 1986," says ARS chemist Attila E. Pavlath. "This is the first commercial product that retains the desirable characteristics of fresh apples without leaving a detectable residue."

Pavlath collaborates with researchers in the Process Chemistry and Engineering Research Unit at ARS' Western Regional Research Center in Albany, California. He retired from ARS after 32 years to serve as president of the American Chemical Society.

The key discovery by ARS researchers was that certain calcium salts protect apple slices from color, taste, or texture changes. ARS chemists Dominic W.S. Wong and Wayne M. Camirand (retired) also worked on the project.

"When you cut an apple, many physiological changes occur to the fruit tissue, including browning and the breakdown of cells," Pavlath says. "But this new treatment slows the process for at least 2 weeks." This time is crucial to allow for packaging, shipping, and marketing, he says.

Convenience foods like cut fruit and premixed salads—known as lightly processed—are growing in popularity. According to the International Fresh-cut Produce Association, ready-to-eat fruits and vegetables make up about 10 percent of produce sales, worth up to $10 billion annually.

The equipment necessary to peel, core, and slice the apples already exists. Scientists at Mantrose-Haeuser took the ARS findings and created a proprietary formulation using FDA-approved vitamins and minerals. They are marketing the product under the trade name NatureSeal for use by fresh-cut processors and the food-service industries. They are also developing treatments for other hard-to-keep produce, such as potatoes, carrots, peppers, onions, and bananas.

The team has patented their methods (Patent No. 5939177).—By **Kathryn Barry Stelljes,** ARS.

This research is part of New Uses, Quality, and Marketability of Plant and Animal Products, an ARS National Program (#306) described on the World Wide Web at http://www.nps.ars.usda.gov/programs/cppvs.htm.

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